

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : MORIZAKI MASAYUKI

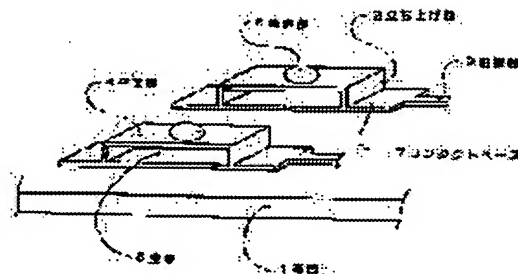
(22)Date of filing : 12.01.1994

(72)Inventor : MORIZAKI MASAYUKI

(54) MICRO CONTACT WITH SPRING CHARACTER**(57)Abstract:**

PURPOSE: To provide a contact where implementing and replacement of a semiconductor bare chip is easy, inspection with the bare chip is assured, and use in a high frequency range is possible

CONSTITUTION: At a specified position art a substrate 1 made of ceramics, resin, etc., a conductive contact base 7 and a wiring part 2 are provided, and at the specified position of contact base 7, two conductive rising parts 3 are provided, and further, with a conductive flat part 4, the two rising parts 3 are connected to each other, so that a space 6 is established before the contact base 7, and at the center part of flat part 4, a conductive hemisphere projection, or, a contact point part 5 is provided. It may be cantilever spring shape with a single rising part 3, or, the rising part 3 and flat part 4 may be constituted of a curved surface, or, they may be stacked.

**LEGAL STATUS**

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[Date of final disposal for application]

[Patent number]

[Date of registration]

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CLAIMS

[Claim(s)]

[Claim 1] (b) Prepare the contact breaker plate (7) made with the conductor at the substrate (1) made by the ceramics, resin, etc.

(b) Prepare so that it may connect with the flat-surface section (4) which was made with the conductor in the location where a contact breaker plate (7) is suitable and which rose, prepared the section (3) and was made with the conductor and space (6) may be made between contact breaker plates (7).

(c) Prepare the projection and contact surface (5) which carried out the form of hemispherical ** made with the conductor in the suitable location of the flat-surface section (4). Micro contact possessing the spring nature of the above configuration [claim 2] Micro contact possessing the spring nature of claim 1 which constituted either the starting section (3) or the flat-surface section (4) and both configurations from a curved surface, for example, a cylinder, and a spherical shell [claim 3] Micro contact possessing the spring nature of claim 1 which piled up and prepared a contact breaker plate (7), the starting section (3), the flat-surface section (4), and a contact surface (5) in multistage by turns, and claim 2.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention is invention about the micro contact possessing the spring nature for mounting of the bare chip of a semi-conductor, or inspection.

[0002]

[Description of the Prior Art] When the bare chip of a semi-conductor was conventionally fixed to a substrate, there was a thing using melting, such as wire BONINGU, and a flip chip, a tab, or welding. Moreover, the rod-like probe was used for inspection of a bare chip.

[0003]

[Problem(s) to be Solved by the Invention] These had the following faults.

(b) What fixes a bare chip to a substrate by melting or welding has the need of removing a defect chip from a substrate, when the defect of a chip occurs. However, the case of being difficult discarded many this activity the whole substrate as a result in many cases.

(b) When measuring the property of a bare chip using a probe, since wiring from a probe to a measuring machine

machine was long, it became high in an inductance or conductance, and since the probe itself was small in the ability not responding to high frequency, manufacture and measurement were difficult. This invention is made in order to remove these faults.

[0004]

[Means for Solving the Problem]

(b) Prepare the contact breaker plate (7) and the wiring section (2) which were made with the conductor in the location where the substrate (1) made by the ceramics, resin, etc. was specified.

(b) Prepare so that the two starting sections (3) may be mutually connected by the flat-surface section (4) which was made with the conductor in the location where the contact breaker plate (7) was specified and which rose, prepared the two sections (3) and was further made with the conductor and space (6) may be made between contact breaker plates (7).

(c) Prepare the projection and contact surface (5) which carried out the form of hemispherical ** made with the conductor in the center section of the flat-surface section (4). Under the present circumstances, the starting section (3) and the flat-surface section (4) may be made into a curved-surface configuration, or it is good also as a spring configuration of the cantilever which made the starting section (3) one place, and these may be further used for multistage in piles.

[0005]

[Function] In use of this article, the micro contact (9) which possesses spring nature in the substrate for inspection, mounting, etc. (1) is formed in electrodes, such as a semi-conductor bare chip (8), and the location which counters. By making it contact, pressurizing using a fixed device (11) from a top, a contact surface (5) contacts a partner's electrode, when the flat-surface section (4) and the starting section (3) carry out elastic deformation further, contact is maintained at ****, and the property measurement and mounting by the measuring instrument (10) can be performed.

[0006]

[Example] Hereafter, it de** using drawing 1 , drawing 2 , drawing 3 , drawing 6 , and drawing 7 about the example 1 of invention.

(b) Prepare the contact breaker plate (7) and the wiring section (2) which were made with the conductor using a substrate manufacturing technology etc. in the location where the substrate (1) made by the ceramics, resin, etc. was specified.

(b) Prepare so that the two starting sections (3) may be mutually connected by the flat-surface section (4) which was made with the conductor in the location where the contact breaker plate (7) was specified and which rose, prepared the two sections (3) and was further made with the conductor and space (6) may be made between contact breaker plates (7).

(c) Prepare the projection and contact surface (5) which carried out the form of hemispherical ** made with the conductor in the center section of the flat-surface section (4).

In use of this article with the above configurations, as shown in drawing 6 and drawing 7 , as for this invention, the micro contact (9) with which spring nature is provided in the substrate for inspection, mounting, etc. (1) is formed in electrodes, such as a semi-conductor bare chip (8), and the location which counters. By making it contact, pressurizing using a fixed device (11) from a top, when a contact surface (5) contacts a partner's electrode and the flat-surface section (4) and the starting section (3) mainly carry out elastic deformation further, contact is kept certain and the property measurement and mounting by the measuring instrument (10) can be performed. Under the present circumstances, as shown in drawing 3 , in order to adjust a variation rate and contact pressure, you may put on multistage. Moreover, the starting section (3) and the flat-surface section (4) may consist of curved surfaces.

[0007] Hereafter, the example 2 of invention is explained using drawing 4 and drawing 5 .

(b) Prepare the contact breaker plate (7) and the wiring section (2) which were made with the conductor using a substrate manufacturing technology etc. in the location where the substrate (1) made by the ceramics or resin was specified.

(b) Prepare so that the edge of the flat-surface section (4) which rose, prepared the one section (3) and was further made with the conductor made with the conductor in the location where the contact breaker plate (7) was specified may be started, and it may connect with the section (3) and space (6) may be made between contact breaker plates (7).

(c) Prepare the projection and contact surface (5) which carried out the form of hemispherical ** made with the conductor in an edge contrary to the starting section (3) of the flat-surface section (4).

Under the present circumstances, as shown in drawing 5 , in order to adjust a variation rate and a contact pressure, you may put on multistage. Moreover, the starting section (3) and the flat-surface section (4) may consist of curved surfaces.

[0008]

[Effect of the Invention]

(b) Structure is simple, and since a substrate manufacturing technology can be used and contact of a very small pitch can be constituted from a very small configuration, the multipoint contact to electrodes, such as a bare chip, is attained.

(b) Since the die length of the conductor of contact is short, an inductance and conductance can be made smaller than an inspection jig conventional probe type, and it can respond to a RF more.

(c) Since spring nature is provided and a substrate and dispersion of a load are absorbable, stable contact can be maintained.

(d) When the defect of a semi-conductor occurs for mechanical connections unlike the melting connection using a reflow like before, or welded connection like wirebonding, it becomes possible to manage exchange of the quick and narrow range, and becomes advantageous in price.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view of an example 1.

[Drawing 2] It is the sectional view of an example 1.

[Drawing 3] It is the sectional view of the application of an example 1.

[Drawing 4] It is the perspective view of an example 2.

[Drawing 5] It is the perspective view of the application of an example 2.

[Drawing 6] It is the decomposition perspective view using this invention of a measurement outline.

[Drawing 7] It is the sectional view of the mounting outline using this invention.

[Description of Notations]

1 Substrate

2 Wiring Section

3 Starting Section

4 Flat-Surface Section

5 Contact Surface

6 Space

7 Contact Breaker Plate

8 Semi-conductor Bare Chip

9 Micro Contact Possessing Spring Nature

10 Measuring Instrument

11 Fixed Device

[Translation done.]

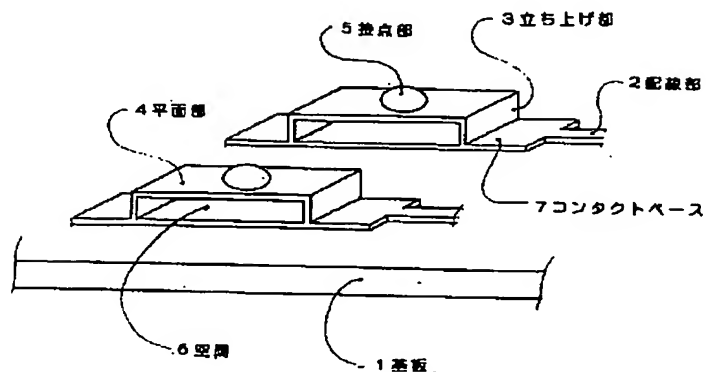
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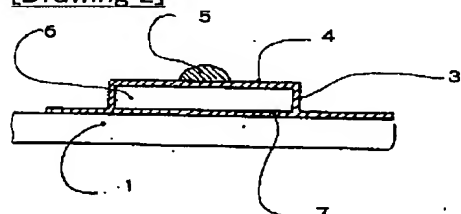
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DRAWINGS

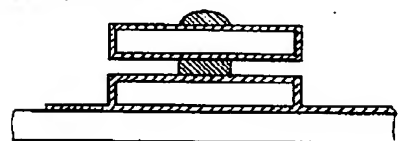
[Drawing 1]



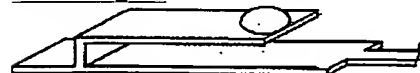
[Drawing 2]



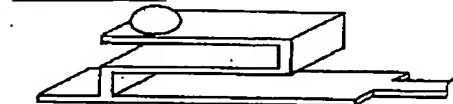
[Drawing 3]



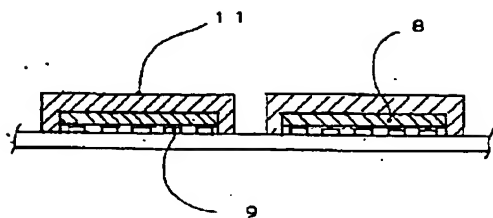
[Drawing 4]



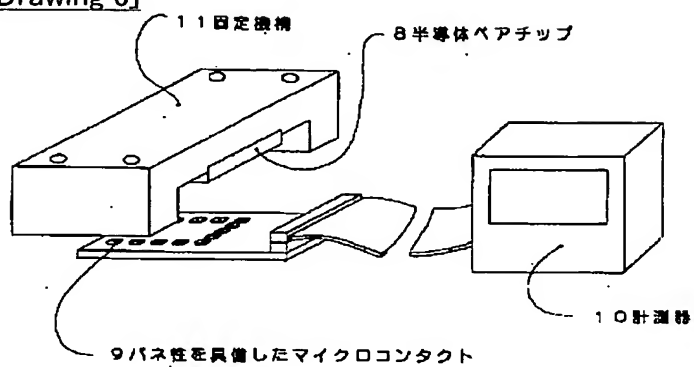
[Drawing 5]



[Drawing 7]



[Drawing 6]



[Translation done.]

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(21) 出願番号	特願平6-25855	(71) 出願人	594033709 森崎 正幸 神奈川県川崎市高津区末長1521 プリン マンション101号
(22) 出願日	平成 6 年 (1994) 1 月 12 日	(72) 発明者	森崎 正幸 神奈川県川崎市高津区末長1521 プリン マンション101号

(54) 【発明の名称】 パネ性を具備したマイクロコンタクト

(57) 【要約】

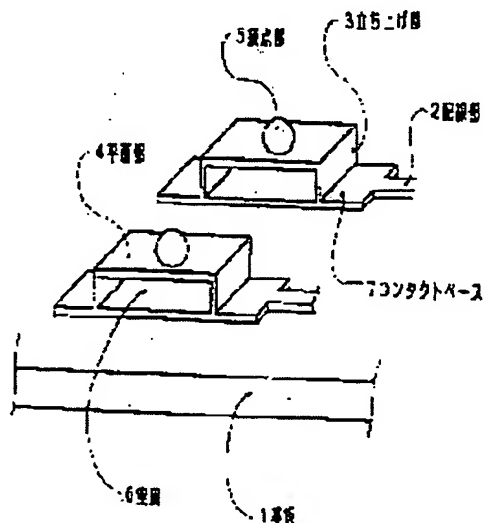
【目的】 半導体のヘアチップの実装及び交換を容易にし、且つヘアチップでの検査を確実且つ高周波の領域でも使用できるコンタクトを提供することを目的とする。

【構成】 (イ) セラミックスや樹脂等でできた基板 (1) の規定された位置に導体でできたコンタクトベース (7) 及び配線部 (2) を設ける。

(ロ) コンタクトベース (7) の規定された位置に導体でできた立ち上げ部 (3) を二カ所設け、更に導体でできた平面部 (4) により二カ所の立ち上げ部 (3) を互いに接続し、且つコンタクトベース (7) との間に空間

(6) ができるように設ける。

(ハ) 平面部 (4) の中央部に導体でできた半球状等の形をした突起、接点部 (5) を設ける。また立ち上げ部 (3) を一カ所とした片持ちのパネ形状としてもよいし、立ち上げ部 (3)、平面部 (4) を曲面で構成したり、これらを多段に積み重ねて構成しても良い。以上の構成を特徴とする



【特許請求の範囲】

【請求項 1】 (イ) セラミックスや樹脂等でできた基板(1)に導体でできたコンタクトベース(7)を設ける。

(ロ) コンタクトベース(7)の適当な位置に導体でできた立ち上げ部(3)を設け、導体でできた平面部(4)と接続し、且つコンタクトベース(7)との間に空間(6)ができるように設ける。

(ハ) 平面部(4)の適当な位置に導体でできた半球状等の形をした突起、接点部(5)を設ける。以上の構成のバネ性を具備したマイクロコンタクト

【請求項 2】 立ち上げ部(3)及び平面部(4)のどちらか若しくは両方の形状を曲面、例えば円筒や球殻から構成した請求項 1 のバネ性を具備したマイクロコンタクト

【請求項 3】 コンタクトベース(7)、立ち上げ部(3)、平面部(4)及び接点部(5)を交互に多段に重ね、設けた請求項 1 及び請求項 2 のバネ性を具備したマイクロコンタクト。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 この発明は、半導体のヘアチップの実装や検査の爲の、バネ性を具備したマイクロコンタクトに関する発明である。

【0002】

【従来の技術】 従来半導体のヘアチップを基板に固定する場合、ワイヤボンディングやフリップチップ、タブ等溶融や溶接を用いるものが有った。又ヘアチップの検査には棒状のプロブを用いていた。

【0003】

【発明が解決しようとする課題】 これらには次のような欠点があった。

(イ) 溶融や溶接によりヘアチップを基板に固定するものはチップの不良が発生した場合基板から不良チップを外す必要が有る。しかしこの作業は困難な場合が多く結果的に基板毎廃棄する場合が多かった。

(ロ) プロブを用いてヘアチップの特性を計測する場合プロブから計測機器迄の配線が長いためにインダクタンスやコンダクタンスが高くなり高周波には対応できなかったり、プロブそのものが小さいために製造や、計測が難しかった。本発明はこれらの欠点を除くためになされたものである。

【0004】

【課題を解決するための手段】

(イ) セラミックスや樹脂等でできた基板(1)の規定された位置に導体でできたコンタクトベース(7)及び配線部(2)を設ける。

(ロ) コンタクトベース(7)の規定された位置に導体でできた立ち上げ部(3)を二カ所設け、更に導体でできた平面部(4)により二カ所の立ち上げ部(3)を互

いに接続し、且つコンタクトベース(7)との間に空間(6)ができるように設ける。

(ハ) 平面部(4)の中央部に導体でできた半球状等の形をした突起、接点部(5)を設ける。この際、立ち上げ部(3)、平面部(4)を曲面形状としたり、立ち上げ部(3)を一カ所とした片持ちのバネ形状としてもよいし更にこれらを多段に重ねて用いても良い。

【0005】

【作用】 本品を使用の場合は検査や実装等の為の基板(1)にバネ性を具備したマイクロコンタクト(9)を半導体ヘアチップ(8)等の電極と対向する位置に設け、上から固定機構(11)を用いて加圧しながら接触させることにより接点部(5)が相手の電極と接触し、更に平面部(4)及び立ち上げ部(3)が弾性変形することにより確実に接触が保たれ、計測器(10)による特性計測や実装を行う事ができる。

【0006】

【実施例】 以下、発明の実施例 1 について図 1、図 2、図 3、図 6、図 7 を用いて説明する。

(イ) セラミックスや樹脂等でできた基板(1)の規定された位置に導体でできたコンタクトベース(7)及び配線部(2)を基板製造技術等を用いて設ける。

(ロ) コンタクトベース(7)の規定された位置に導体でできた立ち上げ部(3)を二カ所設け、更に導体でできた平面部(4)により二カ所の立ち上げ部(3)を互いに接続し、且つコンタクトベース(7)との間に空間(6)ができるように設ける。

(ハ) 平面部(4)の中央部に導体でできた半球状等の形をした突起、接点部(5)を設ける。

本発明は以上のような構成で本品を使用の場合は図 5、図 7 に示すように検査や実装等の為の基板(1)にバネ性を具備したマイクロコンタクト(9)を半導体ヘアチップ(8)等の電極と対向する位置に設け、上から固定機構(11)を用いて加圧しながら接触させることにより接点部(5)が相手の電極と接触し更に平面部(4)及び立ち上げ部(3)が主に弾性変形することにより確実に接触が保たれ、計測器(10)による特性計測や実装を行う事ができる。この際図 3 に示すように変位及び接触圧を調整するために多段に重ねても良い。また、立ち上げ部(3)、平面部(4)を曲面で構成しても良い。

【0007】 以下、発明の実施例 2 について図 4、図 5 を用いて説明する。

(イ) セラミックスや樹脂等でできた基板(1)の規定された位置に導体でできたコンタクトベース(7)及び配線部(2)を基板製造技術等を用いて設ける。

(ロ) コンタクトベース(7)の規定された位置に導体でできた立ち上げ部(3)を一カ所設け、更に導体でできた平面部(4)の端を立ち上げ部(3)と接続し、且つコンタクトベース(7)との間に空間(6)ができる

ように設ける。

(ハ) 平面部(4)の立ち上げ部(3)と逆の端に導体でできた半球状等の形をした突起、接点部(5)を設ける。

この際図5に示すように変位及び接圧を調整するために多段に重ねても良い。また、立ち上げ部(3)、平面部(4)を曲面で構成しても良い。

【0008】

【発明の効果】

(イ) 構造が単純で、基板製造技術を用いることができるため微少な形状で微少なピッチのコンタクトが構成できるため、ヘアチップ等の電極との多点接触が可能となる。

(ロ) コンタクトの導体の長さが短いためにインダクタンスやコンダクタンスを従来のプローブタイプの検査ジグより小さくでき、より高周波に対応する事ができる。

(ハ) バネ性を具備しているため基板や加重のばらつきを吸収できるため安定的な接触を保つ事ができる。

(ニ) 従来のようなリフローを用いた溶融接続やワイヤボンディングの様な溶接接続と異なり、機械的接続のため半導体の不良が発生した場合、すばやくかつ狭い範囲の交換で済ます事が可能となり価格的に有利になる。

【図面の簡単な説明】

【図1】 実施例1の斜視図である。

【図2】 実施例1の断面図である。

【図3】 実施例1の応用例の断面図である。

【図4】 実施例2の斜視図である。

【図5】 実施例2の応用例の斜視図である。

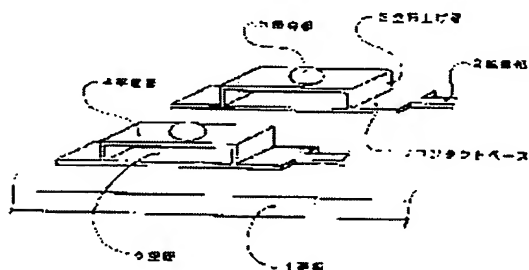
【図6】 本発明を利用した計測概要の分解斜視図である。

【図7】 本発明を利用した実装概要の断面図である。

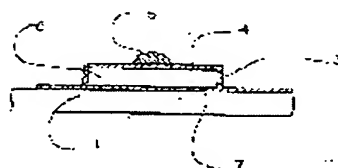
【符号の説明】

- 1 基板
- 2 配線部
- 3 立ち上げ部
- 4 平面部
- 5 接点部
- 6 空間
- 7 コンタクトベース
- 8 半球体ヘアチップ
- 9 バネ性を具備したマイクロコンタクト
- 10 計測器
- 11 固定機構

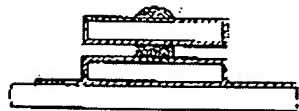
【図1】



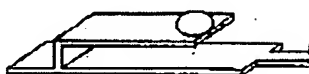
【図2】



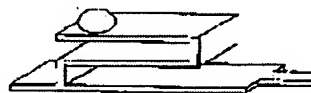
【図3】



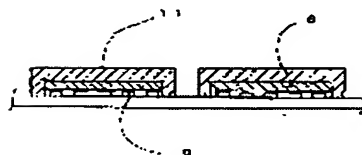
【図4】



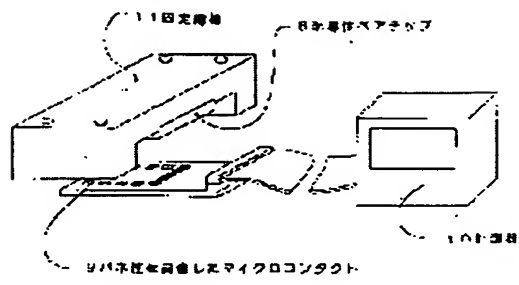
【図5】



【図7】



【図6】



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